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Greening City: Opportunities And Challenges in Workforce Development for A Sustainable Economy

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Abstract

This study aims to investigates workforce readiness in Jakarta to adapt to green jobs as part of the broader transition toward a sustainable green economy. The research highlights the increasing urgency of addressing environmental challenges, such as climate change and pollution, by fostering sustainable development through green employment. The study employs a survey method involving 1,144 respondents from diverse demographic and educational backgrounds, analysing mental, behavioural, and skill readiness to adopt green jobs. Results indicate a high level of readiness for all three aspects. Mental readiness reflects strong awareness of environmental responsibility, though active engagement, such as reporting workplace violations, requires improvement. Behavioural readiness reveals support for sustainability initiatives, yet participation in labour unions remains low. Skill readiness demonstrates strong technical capabilities for sustainability practices, but stress management and interpersonal skills need enhancement. The study also identifies key sectors contributing to emission reductions, including agriculture, renewable energy, waste management, and construction, with varying potential across industries. Challenges persist, such as limited access to green technologies and insufficient stakeholder collaboration. Recommendations emphasize the integration of Green Human Resource Management, enhanced training programs, and supportive policies to accelerate green job creation and adoption. By fostering cooperation among government, industry, and education sectors, Jakarta can leverage its position as Indonesia's economic hub to pioneer sustainable practices and significantly contribute to global environmental goals.

Keywords: green city, sustainable economy, workforce development, green jobs

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1. Introduction

The intensifying global climate change has posed serious challenges to the environment and human life, including air pollution, extreme weather events, and increasing greenhouse gas emissions. This highlights the urgent need for a transition towards sustainable development based on a green economy, as supported by international organizations such as the United Nations (UN). A green economy emphasizes energy efficiency, biodiversity conservation, and reducing environmental harm, with the development of green jobs in sectors such as renewable energy, waste management, and sustainable agriculture as one of its key pillars (Sa'diah, 2024; Suryandari, 2024).

In Indonesia, this transition is projected to increase economic output by IDR 4,376 trillion and GDP by IDR 2,943 trillion over the next 10 years (14.3% of the 2024 GDP), create 19.4 million new jobs, and raise worker incomes by IDR 902.2 trillion (Greenpeace Indonesia, 2023). As the nation's economic and urban hub, Jakarta, with a population of 10 million and 5.44 million workers (Jakarta, 2024), holds a strategic role in driving transformations across energy, transportation, building, and waste sectors while creating opportunities for green jobs. The study evaluates the mental, behavioral, and technical skills of workers and provides recommendations to support the achievement of Sustainable Development Goals (SDGs) in alignment with national policies, such as Government Regulation No. 111 of 2022 on Accelerating SDG Targets and Financial Services Authority Regulation No. 51 of 2017 on sustainable investment based on Environmental, Social, and Governance principles.

Additionally, policies such as the National Medium-Term Development Plan focusing on renewable energy, Law No. 32 of 2009 on Environmental Protection and Management, Law No. 13 of 2003 on Manpower, Presidential Regulation No. 22 of 2017 on the General National Energy Plan, Ministry of Manpower Regulation No. 5 of 2018 on occupational safety in sustainable development projects, and Presidential Instruction No. 5 of 2020 on New Renewable Energy Development provide vital frameworks. Other supporting regulations include the Ministry of Environment and Forestry Regulation No. P.39/MENLHK/SETJEN/KUM.1/6/2017 on Social Forestry and Government Regulation No. 79 of 2014, which accelerate the transformation towards a green economy and greenhouse gas emission reduction. This study is expected to serve as a strategic reference for enhancing workforce capacity, designing sustainability-based training programs, and ensuring the successful implementation of green development policies in Jakarta and Indonesia as a whole.

Sustainability has now become a concept that is continuously evolving and increasingly integrated into the way people live in society. According to Shahnaz Akhtar (2023), a sustainable lifestyle can enhance the well-being of individuals and communities, while promoting health, equality, and resilience within society. If we trace its origins, the concept of sustainability was first introduced in the Brundtland Report (1987), which defined it as "the development that meets the demands of the current generation without compromising the ability of future generations to meet their own needs." However, over time, this concept has expanded and been modified into a

new development model that prioritizes quality of life, social justice, culture, world peace, equity, and social welfare (Hariram et al., 2023).

Along with the practice of sustainability, one of the most influential and widely accepted models is the Triple Bottom Line (TBL), first developed by John Elkington in 1997. This model provides a framework for assessing sustainability performance based on three interconnected dimensions: people, planet, and profit. In this model, sustainability is not only measured by financial profit but also by its impact on society (people) and the environment (planet). The TBL concept is crucial for evaluating a country's economic development beyond conventional economic indicators and supports business strategies related to competitive advantage, decision-making, planning, and sustainable performance (Nogueira et al., 2023). The TBL model is directly linked to the achievement of the Sustainable Development Goals (SDGs) established by the United Nations (UN) in 2015. The SDGs consist of 17 global goals aimed at addressing the world's biggest challenges, such as poverty, inequality, climate change, and environmental degradation. To achieve these goals, the involvement of younger generations plays a critical role in societal transformation (Borojević et al., 2023).

The initiative on green jobs began with a partnership formed in 2007 between the International Labour Organization (ILO), the United Nations Environment Programme (UNEP), and the International Trade Union Confederation (ITUC). In 2008, the International Organization of Employers (IOE) also joined this initiative. According to the Stanef-Puică *et al.* (2022), green jobs are those that contribute to the preservation and maintenance of environmental quality through sustainable natural resource management and the reduction of negative impacts on ecosystems. Green jobs can be found across various traditional sectors, such as manufacturing and construction, as well as in emerging green sectors like renewable energy and energy efficiency.

Green jobs must be decent work, meaning jobs that offer adequate wages, safe working conditions, job security, fair career prospects, and respect for workers' rights. A person's livelihood and sense of self-worth are closely tied to the work they do (Stanef-Puică et al., 2022). In Indonesia, green jobs have a positive impact on the economy, social culture, environment, and society by supporting sustainable tourism and natural resource capacity (Angga Wijaya Holman Fasa et al., 2024). According to Stanef-Puică et al. (2022), green jobs are closely linked to sustainable development, the green economy, and job creation. Several studies highlight the essential role of green jobs in creating new employment opportunities, achieving a balance between work and life, and gaining support from local governments to promote this sector.

However, despite their significant potential, green jobs in Indonesia face several challenges. These include limited resources, lack of access to environmentally friendly technologies, and a lack of understanding of the importance of green innovation among business actors. Additionally, the need to enhance cooperation among various stakeholders, including the government, the private sector, and local communities, is crucial to optimizing the potential of this sector (Papageorgiou et al., 2023). Therefore, Green Human Resource Management practices play an

essential role in improving employee well-being and job satisfaction in Indonesian companies (Rasmussen et al., 2024). As the energy transition moves towards renewable resources and the push for more responsible consumption and production grows, the number of green and sustainable jobs is expected to continue increasing, offering greater opportunities for environmentally friendly economic development in Indonesia (Boone et al., 2023).

Based on the research motivation, phenomena and previous literature review, the statement problem of this study consist of what extent is the workforce in Jakarta mentally, behaviourally, and skilfully ready to adapt to green jobs, and what challenges hinder their effective participation in the transition toward a sustainable green economy. Thus, this study aims to investigates workforce readiness in Jakarta to adapt to green jobs as part of the broader transition toward a sustainable green economy.

2. Research Method

2.1 Research Design

This study uses a quantitative design with a survey approach to measure the readiness of the workforce in DKI Jakarta to adopt green jobs. The quantitative approach allows for the collection of data in the form of measurable numbers that can be analysed objectively, thereby providing a more comprehensive explanation. The survey method was chosen because it can systematically and structurally collect data from a large number of respondents, making it suitable for describing, comparing, and explaining respondents' knowledge, attitudes, and behaviour towards green jobs (Sekaran & Bougie, 2016). In addition, this approach supports the quantitative statistical analysis needed to scientifically evaluate the relationship between variables.

2.2 Variables and Measurement

This study uses three main variables, namely Mental Readiness, Behaviour, and Skills. Each variable is measured using indicators adopted from national legislation, such as laws, presidential regulations, and ministerial regulations relevant to environmentally friendly work. The research instruments have undergone content validation by two experts in the fields of environmental policy and labour.

Additionally, a pilot study was conducted through interviews with the Regional Productivity Development Centre (P3D) of Jakarta Special Capital Region, indicating that the Jakarta Provincial Government is committed to supporting environmentally friendly work as part of achieving the concept of a green city. On the other hand, there is also awareness among companies to implement green recruitment practices, which are recruitment processes that consider environmental aspects. This practice aims to enhance environmental awareness in the recruitment and selection process and is expected to boost employee motivation and improve productivity (Bangura & Lourens, 2023).

For research related to the readiness of the workforce in DKI Jakarta in adopting green jobs, 3 research variables were used. Table 1 show the indicators that applied for all variables. All measurements use a Likert scale with a value range of 1 to 5 where 1 = strongly disagree, 2 = disagree, 3 = moderately agree, 4 = agree and 5 = strongly agree.

Table 1. Operationalization of Variables

Variable Name	Total Indicators	Example of Indicators	Sources
Mental Readiness	21	The statements reflect strong awareness, participation, and readiness to support environmental protection, renewable energy, and sustainability practices aligned with company and government initiatives.	The Law, Presidential Decree, Minister of Manpower Regulation
Behavior	19	The statements show strong support for labor rights, safe work environments, and green initiatives, with a readiness to adopt sustainable practices and renewable energy in the workplace.	The Law, Presidential Decree, Minister of Manpower Regulation
Skill	15	The statements highlight support for green innovations, renewable energy use, and emission reduction, while emphasizing the need for company policies, collaboration, and employee involvement in sustainability.	The Law, Presidential Decree, Minister of Manpower Regulation

2.3 Data and Samples

This study uses primary data which is taken directly from the object of research using a questionnaire which is distributed using google form. The sample withdrawal method uses purposive sampling with the following criteria.

a. Respondents live in Greater Jakarta Area, in accordance with the scope of the research area that has been determined.
b. Respondents have an age of at least 17 years, which indicates that this age is the readiness of the workforce to start thinking about their work at a productive age.

c. Respondents have a minimum education level of high school or equivalent, to show an appropriate level of understanding in answering research questions.
d. Respondents are categorised by gender to enable analysis of differences in readiness for green jobs between men and women, as gender can influence access, participation, and work experience in the green sector.
e. Respondents are classified by employment status to identify variations in readiness levels, work experience, and exposure to environmentally friendly practices, which are also useful in mapping future intervention needs and green labour potential.
f. Respondents listed their place of residence and place of work to support analysis of differences in access to and readiness for green jobs between regions, while also providing a basis for spatial analysis and location-based policy formulation.
g. Respondents were grouped by employment sector to evaluate readiness for green jobs in various industries, given that each sector has different levels of exposure, skill requirements, and potential contributions to the transition to a green economy.

The method of determining the number of samples uses the criteria of Hair et al (2019), namely the number of samples is at least 10 times the number of indicators used in measuring the research variables. The total number of indicators used in the study was 55 indicators so that the minimum sample was 10 x 55 = 550 samples. The results of data collection through google form obtained a total of 1,144 respondents, which means that it has met the minimum sample required in the study.

2.4 Data Analysis Methods

The analytical tools used in this study consist of the following types.

a. Central Tendency (centering measure)

This analytical tool is used to obtain a description of the perception of respondents' answers to the research variables used by using:

1) Mean and standard deviation used to obtain a picture of respondents' perceptions of the three main research variables, namely mental readiness, behavior, and skills related to the readiness of the workforce in DKI Jakarta in adopting Green Jobs. Standard deviation is used to determine the distribution of answers (heterogeneity of answers from respondents).

2) The mode is used to obtain a description of the demographic profile of the respondents.

ANOVA test was conducted to determine and test the differences in mental readiness, behaviour, and skills according to demographic characteristics.In addition, this study also performed additional analyses such as linear regression and t-tests to explore the relationship between readiness variables and specific demographic categories, which are discussed further in the results and discussion section.

3. Results and Discussion

3.1. Results

3.1.1. Respondent Profile

Table 2. Respondent Profile

Description	Total	Percentage	Description	Total	Percentage
Gender			Interest to Green Industry		
Male	459	40.10%	Interest	990	86.50%
Female	685	59.90%	Not interest	154	13.50%
Age			Domicile of Residence		
17-24 years old	642	56.10%	Jakarta	738	64.50%
25-35 years old	238	20.80%	Bogor	135	11.80%
36-55 years old	224	19.60%	Tangerang	106	9.30%
> 55 years old	40	3.50%	Bekasi	88	7.70%
Education			Depok	77	6.70%
Senior high school	300	26.20%	Domicile of Work		
Bachelor degree	609	53.20%	Jakarta	919	80.30%
Master degree	176	15.40%	Bogor	76	6.60%
Doctoral degree	59	5.20%	Tangerang	73	6.40%
Employment Status			Bekasi	45	3.90%
Employed	812	71%	Depok	31	2.70%
Unemployed	332	29%			

Based on Table 2, the results of the data processing of Green Jobs respondents by gender show that the number of men and women is relatively significantly different. Of the total 1,144 respondents, 459 people (40.1%) were male, while 685 people (59.9%) were female. This shows the dominance of female participation in this survey. The survey results on Green Jobs by age group are dominated by the 17-24 years-old age group with a total of 642 people (56.1%). This group has great potential to drive the transition to a green economy. The spirit of idealism and exposure to sustainability issues in the academic environment are thought to contribute to the high readiness scores in the mental and skills aspects (Rahmaningtyas et al., 2023). Respondents aged 25-35 years totalled 238 people (20.8%), followed by the 36-55 years age group of 224 people (19.6%). There were only 40 respondents above the age of 55 (3.5%). The age distribution dominated by the younger group (17-24 years old) indicates greater interest and awareness of the survey from this generation. A total of 609 people (53.2%) had a bachelor's degree or equivalent, followed by senior high school with 300 people (26.2%). Master's level education includes 176 people (15.4%), and respondents with doctoral level education are 59 people (5.2%). Most respondents with S1 education reflect that this survey attracts individuals with higher education backgrounds. Respondents with higher education (S1 and above) appear more conceptually and

technically prepared, in line with the finding that education level is positively correlated with orientation towards environmental values (Abbas & Dogan, 2022). A total of 812 (71%) respondents were employed, while 332 (29%) were unemployed. Among the unemployed respondents, 990 people (86.5%) expressed interest in working in the green industry, while 154 people (13.5%) were not interested. This data shows that most unemployed respondents have an interest in working in the green sector. Most respondents live in Jakarta, with a total of 738 people (64.5%). Bogor 135 people (11.8%), Tangerang 106 people (9.3%), Bekasi 88 people (7.7%), and Depok 77 people (6.7%). The category of respondents based on domicile worked mostly in Jakarta, with a total of 919 people (80.3%). Bogor 76 people (6.6%), Tangerang 73 people (6.4%), Bekasi 45 people (3.9%), and Depok 31 people (2.7%). For respondents who are employed, the financial services and insurance sector is the largest with 223 people (27.5%). This was followed by the corporate services sector with 185 people (22.8%), wholesale and retail trade with 70 people (8.6%), and information and communication with 55 people (6.8%). The sector with the smallest participation was electricity and gas procurement (14 people or 1.7%).

3.1.2. Readiness Level to Adopt Green Jobs

Table 3. Descriptive Statistics of Readiness to Adopt Green Jobs

Aspect	Mean	Standard Deviation
Mental	4.28	0.56
Behavioral	4.22	0.51
Skills	4.29	0.58

Level of Readiness to Adopt Green Jobs – Generally

Generally, respondents' level of readiness to adopt green jobs shows a high mean value. Of the three main aspects (mental, behavioral, and skill), the overall mean score is above 4 on a scale of 5, indicating a strong level of readiness. Mental Readiness has a mean of 4.28, while behavioral readiness has an average of 4.22 and skill readiness had an average of 4.29. This indicates that in general respondents have a supportive understanding, behavior, and skills to adapt to the concept of green jobs (Amjad et al., 2024).

Level of Readiness to Adopt Green Jobs - Mental Aspect

Mental readiness has a mean score of 4.28, with the highest indicator related to “I realize the importance of the principle of prevention and responsibility for environmental damage in every job I do.” (Mean: 4.55). According to Abbas and Dogan (2022), it shows that employees' responsibility towards the environment can be improved through sustainability-based training programs. However, the lowest scoring indicators, such as “I engage or report potential environmental violations in the workplace.” (Mean: 3.83), suggests that despite high awareness, active employee engagement is still lacking (Sozon et al., 2024).

Level of Readiness to Adopt Green Jobs - Behavioral Aspects

In the behavioral aspect, respondents showed high readiness, especially on the indicator "In my opinion, the protection of labor rights related to safe and healthy working conditions is very important." (Mean: 4.63). Research by Rubel et al. (2021) highlighted that employee behavior that supports green jobs can be improved through strengthening environmentally friendly work facilities, such as green transportation systems and efficient waste management. However, the lowest-scoring indicators, such as "I am willing to become a member of a trade union to represent the interests of employees" (Mean: 3.90) suggest that a lack of understanding of the benefits of trade unions is often a barrier to workforce engagement (Kotkova Striteska et al., 2024).

Level of Readiness to Adopt Green Jobs - Skill Aspect

The skill aspect has the highest score among all aspects. The highest indicator related to "I support if the company cooperates with other institutions in developing environmentally friendly products" (Mean: 4.4790) reflects respondents' technical readiness in integrating green jobs. However, one of the lowest indicators was "I feel stressed due to interpersonal relationships, roles or responsibilities at work." (Mean: 3.5743), indicating a need for training in soft skills such as communication and conflict management. Research by Amjad *et al.* (2024) emphasized that interpersonal skills training can improve employee well-being in green work environments.

3.2. Discussion

3.2.1 Respondent Profile

Green Jobs Respondents by Gender

Based on the results of the survey on Green Jobs, which shows the difference in the number of respondents based on gender, women's participation is more dominant than men. Of the total 1,144 respondents, 459 people (40.1%) were male and 685 people (59.9%) were female. This illustrates the tendency for women to be more involved in jobs related to sustainability and the environment. Women make up a larger proportion of the sample. This is noteworthy given the role of gender in the sustainable development agenda, which according to UN Women (2023), is crucial in the process of transforming the work sector. In addition, it can also indicate a paradigm shift in women's participation in sectors that were previously more dominated by men, such as technology-based or engineering jobs related to the environment.

Green Jobs Respondents by Age Group

Based on the results of the Green Jobs survey by age group, the 17-24 age group dominates participation with 642 people (56.1%). The 25-35 age group followed with 238 people (20.8%), while the 36-55 age group totaled 224 people (19.6%). Meanwhile, the number of respondents above 55 years old only reached 40 people (3.5%). The dominance of participation from the 17-24 age group indicates that the younger generation has a higher interest and awareness of jobs related to sustainability and the environment, which is the focus in Green Jobs. This certainly illustrates the positive tendency of the younger generation in adapting and developing interest in

the field of Green Jobs, which provides great hope for the future of a sustainable and environmentally friendly employment sector.

Green Jobs Respondents by Education Group

The survey results show that most respondents have a bachelor's degree or equivalent, with a total of 609 people (53.2%). Followed by respondents who have high school/equivalent education as many as 300 people (26.2%), master's education as many as 176 people (15.4%), and doctoral education as many as 59 people (5.2%). The dominance of respondents with S1 education shows that this Green Jobs survey attracts more attention from individuals with higher education backgrounds. However, despite the dominance of undergraduate education, the participation rate of those with high school education or lower (26.2%) still shows significant interest in Green Jobs. Opportunities in this sector are open not only to those with higher education but also to those with secondary education, especially with the availability of training and courses accessible to various educational backgrounds. Overall, these results illustrate that Green Jobs attracts individuals with higher education backgrounds, but also shows that there are opportunities for different levels of education to participate in this sector.

Green Jobs Respondents by Employment Status

The survey results show that most respondents were employed, 812 people (71%), while 332 people (29%) were unemployed. Among the unemployed respondents, the majority, 290 people (86.5%), expressed a desire to work in the green industry, while 154 people (13.5%) were not interested in this sector. This data illustrates that while most respondents are already actively employed, the unemployed group shows great interest in green jobs. This shows that green jobs have strong growth potential, as many people are interested in working in sustainable industries. Although current participation is low, many unemployed individuals want to enter the field. This creates an opportunity for companies or governments to offer more green job opportunities to meet rising demand.

Green Jobs Respondents by Domicile of Residence and Domicile of Work

The survey results show that most respondents live in Jakarta, with 738 people (64.5%), followed by Bogor 135 people (11.8%), Tangerang 106 people (9.3%), Bekasi 88 people (7.7%), and Depok 77 people (6.7%). This shows that most respondents live in the Greater Jakarta Area, with Jakarta as the center of dominance. This reflects the high concentration of population and economic activity in Jakarta, which is the center of government, business, and industry in Indonesia. When looking at the categories of respondents based on their place of work, the majority also work in Jakarta, with a total of 919 people (80.3%), followed by Bogor 76 people (6.6%), Tangerang 73 people (6.4%), Bekasi 45 people (3.9%), and Depok 31 people (2.7%). This trend shows that even though many respondents live in nearby cities, they prefer to work in Jakarta due to better job prospects. As Indonesia's capital and economic hub, Jakarta offers a wide range of jobs, including in the expanding green industry.

Green Jobs Respondents by Employment Sector

The survey results show that for employed respondents, the financial services and insurance sector is the largest sector, with 223 people (27.5%). This illustrates that many respondents are working in industries that focus on financial services, which is a vital sector in the Indonesian economy. This sector offers many job opportunities in banking, insurance, investment, and other financial services. Increased digitization and technological advancements have also contributed to the development of this sector, which may appeal to many individuals with higher education backgrounds. However, the sector with the least participation is electricity and gas procurement, which involves only 14 people (1.7%) of employed respondents. Although this sector is vital for energy and sustainability, low participation may be due to its focus on infrastructure and the need for specialized technical skills, offering fewer jobs than other sectors. Overall, respondents are more preferred into professional, financial, and consulting services, reflecting labor market trends favoring these fields. Sectors like electricity and gas, while important, attract fewer workers due to their technical and limited nature.

3.2.2 Readiness Level to Adopt Green Jobs

Level of Readiness to Adopt Green Jobs - In General

Based on the survey results, respondents' overall level of readiness to adopt green jobs shows a high average value. With an average score above 4 on a scale of 5, which covers three main aspects, namely mental, behavioral, and skills, it shows the strong readiness of respondents in adapting to the concept of green jobs. Mental Readiness with an average of 4.28 indicates that respondents have a good understanding and positive attitude towards sustainability and the importance of environmentally focused work. This reflects that many individuals realize their important role in mitigating the effects of climate change and other negative impacts on the environment. High mental readiness also indicates that respondents are ready to accept and support changes towards more sustainable work.

Behavioral Readiness with an average of 4.22 indicates that respondents not only have a good understanding, but are also ready to change their attitudes and habits in support of sustainability. This could include implementing green habits in their daily lives, such as reducing waste, using energy efficiently, and supporting green initiatives in the workplace. Skill Readiness, which has an average of 4.29, shows that respondents feel they have the skills needed to contribute to the green jobs sector. This suggests that many respondents feel adequately trained or have skills relevant to jobs in sustainability-focused fields, such as knowledge of green technologies, efficient natural resource management or sustainability policies.

Level of Readiness to Adopt Green Jobs - Mental Aspect

The survey results show that respondents' mental readiness has a high average score of 4.28, with the highest indicator relating to an understanding of the importance of the principles of prevention and responsibility for environmental damage in every job performed, which obtained an average score of 4.55. This shows that respondents have a very good awareness of the

importance of protecting the environment and understand that every job must consider its impact on environmental sustainability. This awareness is a positive step, as it signifies that they understand their role in environmental conservation efforts in the world of work. According to Abbas and Dogan (2022), increasing employee responsibility for the environment can be achieved through training programs based on sustainability principles. This is in line with the survey findings which show that although respondents have a high understanding of the importance of environmental principles, they may need to be further encouraged to participate in sustainability practices in the workplace through more intensive education and training.

However, despite the high level of awareness, the lowest-scoring indicator was the statement "I engage or report potential environmental violations in the workplace," which obtained a mean score of 3.83. This suggests that despite high awareness of environmental issues, respondents' active involvement in reporting or addressing environmental violations in the workplace is still limited. This could be due to several factors, such as the lack of clear facilities or mechanisms to report violations, or even fear of the negative impact of reporting such issues in the workplace. Sozon et al. (2024) also stated that although awareness of the importance of sustainability is very high, the implementation of concrete changes in behavior or active involvement still requires greater support from the organization, such as providing safe and clear channels for employees to report violations or get directly involved in sustainability initiatives.

Level of Readiness to Adopt Green Jobs - Behavioral Aspects

On the behavioral aspect, respondents showed a high readiness to adopt sustainability principles at work, with significant mean scores. One of the highest-scoring indicators is "In my opinion, the protection of labor rights related to safe and healthy working conditions is very important," which obtained an average score of 4.63. This shows that respondents highly value the importance of protecting labor rights, particularly in terms of safe and healthy working conditions. This reflects a good understanding of how a safe and healthy working environment plays a role in supporting sustainability and workforce well-being, as well as the integration of sustainability values in social and environmental aspects. Research by Rubel et al. (2021) also highlights that employee behavior that supports green jobs can be enhanced by providing environmentally friendly work facilities, such as green transportation systems and efficient waste management.

However, the indicator with the lowest score on the behavioral aspect is the statement "I am willing to become a member of a trade union to represent the interests of employees," which obtained an average score of 3.90. This suggests that while respondents have a high awareness of the importance of labor rights, involvement in labor unions is still limited. One possible reason is the lack of understanding of the benefits of labor unions, which is often an obstacle for the workforce to actively participate. Kotkova Striteska et al. (2024) note that many workers are not fully aware of the important role of trade unions in fighting for their rights, including in terms of protection of working conditions and awareness of environmental issues that impact the workforce.

Level Readiness to Adopt Green Jobs – Skill Aspect

In the skills aspect, respondents showed a very high readiness to adopt green jobs principles, with the highest average score among all aspects studied. One of the indicators that recorded the highest score was the statement "I support if the company collaborates with other institutions in developing environmentally friendly products", which obtained an average score of 4.47. This reflects respondents' technical readiness to support collaboration between companies and other institutions to develop environmentally friendly products, which is an important part of green jobs implementation. This suggests that respondents feel they have the necessary skills to engage in sustainability endeavors, especially in relation to developing products that focus on preserving the environment.

However, despite high technical readiness, the lowest-scoring indicator in the skills aspect was "I feel stressed due to interpersonal relationships, roles or responsibilities at work", with a mean score of 3.57. This score indicates that while respondents have sufficient technical skills to adapt to green jobs, there are challenges related to interpersonal skills, such as effective communication, conflict management, or harmonious working relationships. The perceived stress of interpersonal relationships or unclear roles in the workplace can hinder employee performance and well-being in an environmentally friendly work environment.

Research by Amjad et al. (2024) emphasized that improving interpersonal skills through training can contribute to employee well-being in a green work environment. The ability to communicate effectively, work in teams and manage conflict well are critical skills, especially in a work environment that encourages change and adaptation to green practices. Therefore, although respondents indicated high technical readiness, companies or organizations need to pay attention to developing employees' soft skills to ensure they can work harmoniously in teams and adapt to changes that occur, especially in the transition to green jobs.

3.2.3. Comparison of Readiness in Various Perspectives

Comparison of Readiness by Gender

The survey results show few significant differences between men and women's readiness to adopt green jobs. In general, both men and women showed a high level of awareness of the importance of green jobs for environmental sustainability. However, some differences in access, training, and green job preferences emerged based on gender (He et al., 2019). Overall, despite progress in awareness and readiness to implement green jobs, there are still gaps by gender that need attention. Training programs and policies that support gender equality in access to green jobs will be critical to achieving inclusive and sustainable green jobs implementation in DKI Jakarta.

Comparison of Readiness by Age

The results show that younger age groups tend to be more prepared to adopt green jobs compared to older age groups. This is due to several factors, such as a higher level of awareness

of environmental issues, as well as easy access to information and training related to green jobs through digital platforms (Suryadi and Nasution, 2024). On the other hand, the older age group shows a lower level of readiness, possibly due to limited knowledge of the latest technology and resistance to changes in the way of working. Nonetheless, some of these groups show significant readiness when supported by relevant training or extension programs.

Comparison of Readiness by Educational Background

The results showed differences in the level of readiness in implementing green jobs based on the respondents' school education background. According to Zacky and Sholihah (2023), respondents who come from an educational background in the formal field tend to be more prepared in adopting green jobs, because they have a better understanding of environmental issues as well as the technical skills needed for green jobs. Respondents with non-formal educational backgrounds, on the other hand, showed lower readiness. This is due to a lack of in-depth understanding of the technical and environmental aspects of green jobs. Nonetheless, some of the respondents with non-formal backgrounds showed higher readiness potential when given additional training or courses related to green jobs. This finding indicates the need for more efforts to bridge the knowledge gap between different educational backgrounds through more inclusive and relevant training and education programs.

Comparison of Readiness by Education Level

The results of this study show that there are differences in the level of readiness in implementing green jobs based on the respondents' education level. Respondents with higher levels of education showed greater readiness in adopting green jobs. This is due to a deeper understanding of environmental issues and technical skills relevant to green jobs. On the other hand, respondents with lower levels of education showed lower levels of readiness, due to limitations in understanding technical concepts related to sustainability. Nonetheless, some of them showed significant readiness when provided with additional relevant training or education. These findings emphasize the importance of access to supportive education and training so that all groups can be better prepared to contribute to the green jobs sector, regardless of their educational background.

Comparison of Readiness by Workforce

The results of this study show significant differences in the level of readiness to adopt green jobs based on labor status, namely between those who are employed and those who are unemployed. Employed respondents tend to show higher readiness in adopting green jobs, especially if their jobs are related to sustainability-related sectors or green industries. Meanwhile, unemployed respondents, despite their interest in green jobs, showed a lower level of readiness. This may be due to limited access to information on green job opportunities or lack of technical skills required to enter the sector. This research indicates that workers who are already employed in the sector tend to be more prepared to transition or develop their careers in green jobs, while

those who are not yet employed need support in the form of training and awareness-raising to prepare them to enter the green job market.

3.2.4. Sector Contribution to Emission Reduction in Indonesia

Agriculture, Forestry and Fisheries

Based on the results of the study, 25.1% agreed that this sector is a major contributor to emission reductions. By implementing sustainable agricultural practices, such as fertilizer management, agroforestry, and efficient irrigation techniques. Emission reductions can also be achieved through mitigating methane emissions from rice cultivation and livestock waste management. According to a study by Leahy et al. (2020), mitigating greenhouse gas emissions from agriculture can help achieve the Paris Agreement targets through practices such as crop diversification and good land management.

However, the readiness of human resources (HR) in this sector remains varied. While there is growing awareness, many workers in rural and agricultural areas may lack access to training in sustainable practices or green technology. This gap indicates a need for cross-sectoral labor planning, such as integrating green curriculum in vocational schools focused on agriculture, to ensure that emission-reduction strategies are matched by an adequately skilled workforce.

Water Supply, Garbage, Waste Management and Recycling

The next major sector, accounting for 18.8%, highlights the critical role of efficient waste management and recycling in reducing methane and carbon dioxide emissions. Waste management, when executed effectively, significantly mitigates environmental impact by reducing harmful greenhouse gases, especially methane, which is often released from landfills. One of the key strategies in this area involves the utilization of biogas technology, which captures methane emissions from organic waste to generate energy, further contributing to emission reduction. According to a study by McKinsey (2020), an optimal waste management system, integrating technologies like biogas and promoting a circular economy, can reduce emissions by up to 20% from the sector's baseline. The circular economy focuses on reusing, recycling, and reducing waste, ensuring that materials are continuously cycled back into the economy rather than being discarded.

Despite its potential, this sector often struggles with limited skilled labor and fragmented coordination across waste value chains. Vocational training programs could be expanded to include modules on circular economy principles and waste-to-energy technologies. Local governments also need to strengthen public-private partnerships to create stable career pathways in this green sub-sector.

Financial Services and Insurance

The sector contributes to sustainability efforts through investments in green energy and sustainable project finance. One of the main ways to support the transition to a low-carbon economy is through innovative financing, such as green bonds. Green bonds allow companies to

raise funds that are used to finance projects focused on reducing carbon emissions, energy efficiency, and renewable energy development. With this mechanism, investors can support initiatives that support sustainability and environmental sustainability. According to Mavlutova et al. (2023), green bonds have an important role to play in supporting the transition to a low-carbon economy, as they help companies and countries to secure the funds needed to implement emission reduction strategies and switch to cleaner energy solutions. Through this financial instrument, the financial sector can channel funds to sectors that are critical to achieving climate change and energy transition goals, such as renewable energy, waste management, and green transportation. This funding not only drives emissions reductions but also supports sustainable and resilient economic development.

However, without adequate government incentives and risk mitigation policies, green financing may remain limited to high-return projects. A lack of clear, long-term green investment frameworks can discourage private capital from flowing into early-stage or labor-intensive green sectors, such as renewable energy or sustainable agriculture, which are essential for both emission reduction and job creation.

Electricity and Gas Procurement

Renewable energy-based power generation, such as solar and wind power, is a key solution to reducing emissions in the energy sector. The shift from fossil fuels to clean energy is accelerating the reduction of carbon emissions produced by this sector. Fossil fuels, which have been the main source of global energy, produce large amounts of carbon dioxide (CO2) emissions that contribute to global warming. Alternatively, renewable energy, which produces no carbon emissions in its generation process, offers a highly effective solution to reduce environmental impact. According to Liu & Han (2024), this transition to clean energy is not only important for reducing greenhouse gas emissions, but also for supporting long-term sustainability. Solar and wind power, as environmentally friendly energy sources, have great potential in replacing dirtier coal and gas-based power plants. The sustainability of renewable energy is further enhanced by the decreasing cost of the technology, which makes it more affordable and more accessible to different countries and industries. With the accelerating shift to clean energy, the energy sector can contribute significantly to meeting global emission reduction targets and help the world transition towards a greener, more sustainable economy.

Nevertheless, a critical challenge lies in the shortage of technically trained workers capable of installing, maintaining, and operating renewable energy systems. The data reveals a disconnect between the sector's growing importance and the availability of skilled labor. To address this, energy-focused vocational schools should integrate renewable energy modules into their curriculum, supported by certification programs and industry partnerships to ensure a talent pipeline. This would align workforce capacity with sectoral emission reduction goals and national energy transition plans.

4. Conclusion and Recommendations

This research provides a comprehensive picture of community readiness to respond to the Jakarta Provincial Government's desire to provide green jobs, while identifying challenges and opportunities. The results of the study show that the workforce in DKI Jakarta has a high readiness to adopt green jobs, as measured by three main aspects: mental readiness, behavior, and skills. The average score for all three aspects is above 4 on a scale of 5, reflecting good awareness and capability among respondents. Mental readiness and skills stand out with the highest scores, indicating that workers in Jakarta understand the importance of sustainability principles and have the technical ability to adapt to green work. However, active engagement in reporting environmental issues in the workplace as well as participation in labor unions are still relatively low, indicating room for improvement.

In addition, these readiness levels show variations based on demographic factors such as age, education level and employment status. Younger age groups, especially those aged 17-24, tend to be more prepared than older age groups. Education level is also an important factor, with individuals with higher education showing greater preparedness due to a better understanding of environmental issues and technical skills. Meanwhile, respondents who are already working in sustainability-relevant sectors are more prepared than those who are unemployed, despite the high interest in green jobs among job seekers. The contribution of each economic sector to carbon emission reduction is also one of the key points in this study. The agriculture, forestry and fisheries sectors play a major role through the implementation of sustainable practices such as agroforestry and waste management. The renewable energy and waste management sectors show great potential to reduce emissions through technological innovation and circular economy approaches. In addition, the financial services sector supports sustainability efforts through green project funding, while the construction sector contributes through the implementation of green buildings and material efficiency. These findings can help local governments and vocational training institutions design more targeted and responsive programs to support the growth of the green job sector. With growing interest from job seekers but currently low participation, there is an opportunity to provide training that focuses on both technical and soft skills needed in environmentally friendly industries. By aligning training programs with industry demands, these institutions can help prepare a skilled workforce, reduce unemployment, and promote sustainable economic development at the local level.

The urgency to adjust the company's operational activities to become more friendly is increasing, the use of fossil fuels and deforestation is at a stage that must be minimized during operational activities. The occurrence of a climate crisis due to increased emissions is one of the threats, for Indonesia which has great potential through natural resources and biodiversity. The Indonesian government through the Ministry of Manpower of the Republic of Indonesia has developed an Occupational Map in the Indonesian National Qualifications Framework with the aim of increasing skilled human resources to meet the needs of environmentally friendly jobs or green jobs.

Supportive incentives and regulations, such as awards for environmentally friendly companies and sanctions for violations of environmental standards, also need to be strengthened. Cross-sector synergies, including the involvement of financial institutions in supporting green project financing, will be key in building a sustainable green jobs ecosystem. In addition, public awareness campaigns on the benefits of green jobs need to be continuously conducted to increase community participation. The transition to green jobs in DKI Jakarta requires not only workforce readiness but also close collaboration between various stakeholders. Through a holistic and innovative approach, Jakarta has a great opportunity to become a pioneer in the development of an inclusive and sustainable green economy, as well as contribute to global efforts in addressing climate change and creating a better future for future generations.

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